Foodborne Illness Outbreak Response: A Snapshot of Ohio

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Foodborne Illness Outbreak Response: A Snapshot of Ohio

Calen Wherry

Wright State University
FOODBORNE ILLNESS OUTBREAK RESPONSE

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Abstract

Biosurveillance is one of the primary roles of local Public health offices. As the all-hazards (biological, chemical, and radiation emergencies) approach adds to the responsibilities already performed in foodborne illness outbreak response, it is crucial to assess the capabilities and robustness of the local public health Foodborne Illness (FBI) response. By surveying the most populated counties in Ohio with a checklist based on the 2009 Council for Improvement of Foodborne Outbreak Response (CIFOR) guidelines, it was possible to obtain a snapshot of the current outbreak response capabilities. Though only one county reported 100% compliance with the checklist, the overall average was 73%. Minimum requirement items for outbreak response were at 83%. The overall compliance when stratified from “satisfactory” to “good” to “excellent” was 83%, 75%, and 64% respectively. While some local public health offices have made some efforts to improve, there is still considerable room for improvement to better handle more “disaster level” outbreaks.
Foodborne Illness Outbreak Response: A Snapshot of Ohio

In 2001, the ability of a single terrorist organization to create a disaster of the magnitude of the World Trade Center destruction caught many by surprise. It showed a fundamental flaw in our ability to monitor, predict, and appropriately mitigate disasters. In response, President George W. Bush began a process that changed how our government achieved these goals and altered the very structure of our national agencies (Homeland Security Presidential Directive 1). It became clear in this process that simply avoiding the next bombing fell far short of the necessary protection our nation requires. An all-hazards approach was adopted to rectify this deficiency and would encompass all potentially disastrous events whether they were man-made or natural.

Literature Review

Infectious disease became a concern within this new approach as it could be either natural or man-made (weaponized) and the complexities involved in the discovery and mitigation of these diseases were quickly realized. Many different government agencies were responsible for specific pathogens or specific hosts. The 2011 E. Coli outbreak in Germany highlights the current difficulties with detection and reaction to infectious disease in just such a fractured system. In this outbreak, 3,200 people were sickened and 39 confirmed dead by a single bacterial agent, and scientists and physicians of Germany stated the response was slow and hindered by inefficiencies at every step of the process (Turner, 2011). The solution lies in a systematic surveillance and response that utilizes rapid communication of emerging issues.

Biosurveillance, the systematic observation of an area of operations for biological hazards, became the tag word for this ultimate process for discovery and reporting of infectious disease outbreaks. Some agencies limit the scope of its definition to automated systems that
simply cull data and produce reports (Hoffman, Wilkinson, Bush, Myers, & Griffin, 2003). However, the term has grown to embody the entire process of detection and reporting and it is this definition the U.S. government uses (Jenkins, 2010). The goal of biosurveillance was to eliminate the barriers of a multi-agency approach by increasing lines of communication and possibly create another sub-agency to act as a clearinghouse for all this newly accessible data.

**Federal Deficiencies**

Unfortunately, none of these goals has truly come to fruition. In the years following 9/11, Congress mandated the National Academy of Science to form an advisory committee for biosurveillance analysis and planning. The Homeland Security Presidential Directive 21 (HSPD-21) did the same for the CDC. Since that time, nothing has been done to further these committees to a definable goal or action (Nuzzo, 2007). Recently, federal and state governments have used biosurveillance funds to develop surveillance tools (such as BioWatch) to be used for advance warning. However, no useful assessments have been made of these systems’ efficacy or cost effectiveness (Nuzzo, 2007). The Department of Homeland Security isn’t without fault in this program either. In 2004, DHS created the National Biosurveillance Integration system. Its intent was to consolidate all incoming inputs on biosurveillance and create threat reports on actionable items. By 2007, the Inspector General of DHS found the program floundering in a lack of manning, funding, and, most damaging, a lack of defined goals (Skinner, 2007).

Major General Stephen Reeves (2011), Former Joint Program Executive Officer for Chemical & Biological Defense, Department of Defense (DoD), found in his survey of domestic preparedness panel members that even these senior public health officials had a limited understanding of the United States’ current path towards its biosurveillance goals. When asked who was in charge of the multidisciplinary biosurveillance program, only 11% correctly
responded; “No one.” 41% stated the CDC, which is true for the human health component. Reeves’ (2011) goes on to observe, “the present U.S. biosurveillance system is highly dependent on state and local public health officials, veterinarians, and agricultural agents to voluntarily [communicate] diseases and crop infections.” A lack of capability in local public health offices would, therefore, cripple the entire system.

**Communication Deficiencies**

The communication piece of the biosurveillance puzzle has been the hardest obstacle to overcome. The Department of Health and Human Services (DHHS) noted in 2006 that meaningful and timely data transmission is one the most significant downfalls of current U.S biosurveillance systems. Yet the most recent report from the National Biosurveillance Advisory Subcommittee still calls for more common language and more 'data liquidity' between the agencies to promote the sharing of information (Vaidyanathan, 2011). If achieved, this would have positive impacts at all levels of public health allowing better analyses to help detect relevant patterns in all monitored health complaints. It is no coincidence that effective biosurveillance is essential in the management of catastrophic biological events as well as routine public health practice and disaster response (Engel & Lipkin, 2011).

This two-fold benefit in local public health practice and federal disaster management makes one thing perfectly clear: state and local surveillance programs are the foundation for an integrated national biosurveillance system (Nuzzo, 2007; DHHS, 2006). The federal government’s ability to obtain situational awareness of bio-disastrous events hangs upon the ability of health departments to create flexible lines of communication with the healthcare system (Nuzzo, 2007). However, there is such a large variability within the funding of state and local public health agencies that relying upon them for consistent and reliable sharing is a risky
venture, at best (*Figure 1*). Economic hardship can bring about massive reduction in funding to entire programs in efforts to keep others afloat and programs focused on prevention of perceived low probability events are often the first to be reduced.

*Figure 1*. Percentage of LHDs with Lower Budget in January 2010 as Compared to Previous Year, Excluding One-Time Funding such as ARRA or H1N1 Funding. More than half of LHDs have cuts to core funding in 26 states (NACCHO 2010).

**Local Public Health Deficiencies**

Boulton and Rosenberg’s (2011) recent assessment in Morbidity and Mortality Weekly begins an assessment of state health departments’ epidemiological capacity as they strive to meet the needs of biosurveillance and response. He found the state level health departments had a low capacity for foodborne detection and response, mainly citing poor funding for more man-hours and a surprising dearth of postgraduate education in the staff. As it is observed that the federal and state agencies have a great deal of work before they can meet their own biosurveillance goals, the ability of local public health agencies to contribute is also in doubt.
FBI as a Measurement Tool

In spite of universal confusion at the federal and state level, and the constant economic struggles, local public health agencies continue to strive for improved biosurveillance capabilities, particularly in the areas they are tasked with (i.e. foodborne illness). In an all-hazards approach, the goal is to respond in a structured manner, regardless of the root cause of the outbreak. This makes foodborne illness response a unique opportunity for the researcher interested in local public health biosurveillance capabilities. Bioterrorist events and killer-flu epidemics are relatively rare at the state and local level, but foodborne illness is, unfortunately, a very common occurrence. The CDC had 4,638 outbreaks reported to them with 117,136 illnesses over the ten-year period of 1998 to 2007 (DeWaal, Klein, Catella, Roberts, & Tian, 2011). Add to this the well-known fact that many outbreaks are not reported to the CDC for various reasons and many more illnesses are not reported to public health. The CDC posted a report that approximated this unknown component in 2010. They stated roughly 48 million people get sick, 128,000 are hospitalized, and 3,000 die from foodborne illness every year. This large number of events makes possible a study that can assess how local health agencies with all-hazard plans apply those plans by observing their foodborne illness responses.

Obviously, a great deal of variation may be present from department to department, so a universally accepted guideline or procedure would be difficult to find for assessment and measurement. The Council to Improve Foodborne Outbreak Response endeavored to create such a guideline in 2009 and distributed it across the nation. It is far from universally accepted, but it is well known. Ninety-four percent of the states report reviewing it and 58% are comparing their procedures against its recommendations (Boulton & Rosenberg, 2011). The CIFOR guidelines do provide a good starting point for comparison of foodborne illness response capacity. By
creating a checklist of the recommended items from CIFOR’s guidelines, local public health agencies can be assessed to see how well they can prepare and respond to a biological event.

**Methods**

The CIFOR guidelines do not spell out what is required for a proper foodborne illness response at the local public health level. There is no checklist in the publication to help an environmental health office determine what they lack. However, the guidelines do give a comprehensive step-by-step process for a response, and it is within this process that we can distill actual people and things required for a maximum response capability. The author created a 29-item checklist with a format that allowed for a binary response format for each item. For example, a reference library was either present or it was not. No assessment was made of its completeness, currency, or accessibility. This makes it possible to execute an objective descriptive study to capture a snapshot of Ohio’s foodborne illness outbreak response.

The original plan was to survey all 131 county public health offices in the state of Ohio to formulate the most accurate snapshot. However, only counties with populations over 100,000 were used to capture the state’s local level capacity. Upon initial contact with smaller counties, it became clear that few had internalized the all-hazards approach or had the funding to increase capabilities to encompass such an approach. In their case, it would be possible to assess their epi capacity based on FBI outbreaks. But it would not be appropriate to then make inference about their all-hazard’s capabilities due to the difference from larger counties in their internal risk assessment, based on funding and populations.

The checklist was sent via email to a member of the environmental health staff following a phone call, where the study was introduced and the rules of the checklist were explained. This was reiterated in the email as well so that a person may refer back to it or in case another person
had to fill out the checklist. Though the Environmental Health Director was sought in most cases, other members of the staff were sometimes delegated to complete the checklist (i.e. epidemiologist, emergency preparation staff, etc.). All targeted offices were contacted by phone; however, the appropriate person to complete the checklist was not always available. Twelve out of the twenty-five chosen counties responded with a completed checklist. Three counties were sent the checklist via email but did not respond back. The remaining offices had personnel designated as best to complete the checklist but these individuals could not be reached within an appropriate timeline (one month) for the completion of the study.

In order to have an affirmative mark on the checklist, each item from the checklist had to be written down somewhere in the office. It is common for a policy to be known by the office as a piece of corporate knowledge. Unfortunately, it cannot be guaranteed that everyone understands that knowledge the same way, if at all. It may be agreed by everyone that the epidemiologist will be the “Team Leader” in the event of an FBI outbreak, but if it was not written in a plan for that person to be the leader, the checklist item “Team Leader” could not be counted. This was done to remove as much subjectivity from the responses and maximize objective results. After explanation of this rule was made, it was subject to an honor system that each person agreed to abide by upon filling out the checklist.

The checklist was broken down into three tiers of items, depending on the importance of the checklist item. The items required to meet a minimum level of illness response capability were considered “Satisfactory” items (Table 1). These items were few in number, as it only requires a single person and a written plan to execute a basic FBI outbreak response. Of course, this single person is easily overwhelmed by an increased number of patients, limited resources, etc. So, those items from the checklist that improved the county’s ability to have a consistent
response even in the face of staff illness, budget constraints, or larger outbreak were labeled “Good” items. The items that maximized the county’s capabilities in all nature of response were placed in the “excellent” category. This stratification was then applied to the returned checklists in order to place the county’s overall capabilities into the appropriate category.

Table 1. Checklist Items Divided by Capability Tier

<table>
<thead>
<tr>
<th>Checklist Item</th>
<th>Excellent</th>
<th>Good</th>
<th>Satisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Team leader</td>
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<tr>
<td>2. Epidemiologic investigator</td>
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<tr>
<td>3. Laboratory investigator</td>
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<tr>
<td>4. Public information Officer</td>
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<tr>
<td>5. Emergency response unit</td>
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<tr>
<td>6. Appropriate training in individual duties</td>
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<tr>
<td>7. In field experience of individual duties</td>
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<tr>
<td>8. Individual job descriptions and expected tasks and duties</td>
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<tr>
<td>9. Prepared response protocol</td>
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<td></td>
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<tr>
<td>10. Prepared contact list for notification (especially of external agencies)</td>
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<td></td>
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<tr>
<td>11. Assembled reference library about foodborne illness and control measures</td>
<td></td>
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<tr>
<td>12. Review/update job descriptions, contact lists, and reference library</td>
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<tr>
<td>13. Provide team members with continuing education opportunities</td>
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<tr>
<td>14. Exercise teams together to foster knowledge and team building</td>
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<tr>
<td>15. Conduct debriefing following every real-world event and create lessons learned</td>
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<tr>
<td>16. Have at least one admin staff person</td>
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<td>17. Have at least one legal counsel</td>
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<tr>
<td>18. Have equipment and supplies to perform investigations</td>
<td></td>
<td></td>
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<tr>
<td>19. Have scheduled review of supplies to ensure up to date and no expired supplies</td>
<td></td>
<td></td>
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<tr>
<td>20. Laboratory test requisition forms</td>
<td></td>
<td></td>
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<tr>
<td>21. Access to Pulsenet/or equivalent</td>
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<tr>
<td>22. Training for pulsenet or equivalent</td>
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<tr>
<td>23. Have template for communications with public</td>
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<tr>
<td>24. Have checklist for determining if outside help is needed early</td>
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<tr>
<td>25. Have a formal process in place for initial notifications</td>
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<tr>
<td>26. Standardized outbreak questionnaires</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>27. Environmental assessment forms</td>
<td></td>
<td></td>
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<tr>
<td>28. Chain-of-custody forms</td>
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<tr>
<td>29. Food illness complaint worksheets</td>
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</tbody>
</table>
Results

There was only one Public health office that reported having every single checklist item. The lowest reported items were having a laboratory officer and having a checklist for when to call for outside help; both were reported at 41%. The next trend was noted in the periodic upkeep items. “Review and update job descriptions and library”, “exercise teams”, and “debrief teams following an FBI” were all reported in range of 50-58%. Possessing an administrative staff person for FBI events was also low at 50%. Only 5 items were over 90% (epidemiologist, public affairs officer, in field experience, reference library, and food illness complaint forms). The next highest reported items were all at 83% (Figure 2).

Once the checklist items were stratified, the reported percentages for the entire group were averaged. Decreasing compliance was noted as tier level increased. Eighty-three percent of items in the “Satisfactory” grouping were met. Moving to the “Good” category, only 75% of the items were met. Finally, the “Excellent” category only had 64% items met. This meets the common sense test in that as a county moves up the stratification, the added items become more difficult or more expensive to achieve. Looking at the minimum items on the checklist (from the “Satisfactory” category), only 83% of the counties had a written plan for an FBI outbreak and the counties that had a list of phone numbers for outside agencies was only 75% (Figure 3).
Figure 2. Percent compliance per checklist item (all responses)

Figure 3. Combining the items within the stratification then taking the mean of the total compliance.
Review of total checklist reporting showed the surveyed counties only had 73% of the checklist items. Removing the items from the “Excellent” category, the percentage only increases to 77%.

**Discussion**

Looking at the lowest reported items, it is concerning that less than half of the offices have a plan for assessing when an outbreak has surpassed their resources. The implication, then, is that they play-it-by-ear for each outbreak and call for help when things get out of hand. Unfortunately, the CIFOR guidelines rightly point out that asking for help early can make or break an effective response. Knowing in advance if an outbreak may have the numbers to overcome the manpower or finances of an office is crucial in asking for help. Similar mistakes were made in New Orleans and Louisiana following hurricane Katrina, and the response was severely hindered.

Commonly, a nurse in the public health office serves as the impromptu laboratory person in an outbreak, so it is not inappropriate that the item is low in compliance. Indeed, most of the counties that marked the category affirmatively were expecting their nurse to fill the role.

As is seen in many offices regardless of the program, it is the upkeep tasks that are often forgotten or glazed over. When a program is first implemented, there may be a great deal of energy and dedication to the endeavor; however, as time passes and other duties creep into play, the attention on the program may wane. So it is not surprising that “exercising team members,” “debriefing members following an event,” and “library and supply checking” are not routinely accomplished. Unfortunately, these tasks may become crucial deficiencies when there are no outbreaks to sharpen a team’s skills upon. Can an office be so effective at prevention that it becomes complacent in response?
It is interesting that not every office had a response plan, particularly when ODH supplies one to all of its county offices, if they desire it. As with any emergency response, failure to have a practiced plan in place is paramount to failure. Though forcing a binary response from the county may miss a lesser degree of compliance, as the main team may know what to do well enough to not require anything in writing. Even still, there are times when those members may be replaced with less knowledgeable people and they would have nowhere to find answers.

It was difficult to place “have prepared contact list for outside agencies” within the stratification levels. The decision to place it into the minimum requirements or “satisfactory” category was done in light of minimally staffed offices. If it was easy to be overwhelmed due to a lack of personnel and resources, then having a phone list of people to call when help was needed would be vital. Of course, it could be argued that if there is a list of phone numbers, there should be plan on when to use it (i.e. prepared plan for when to ask for help, item 24). However, it is sometimes easier for a single person to know when they are overwhelmed versus a team. If poor communication exists between a team, the members may mistakenly rely upon one another when no one is actually completing key tasks.

**Recommendations**

Accreditation could answer for not just the quality of one public health office’s response, but the continuity of all other accredited offices as well. As an extension of this thinking, a specialized checklist for the Ohio Department of Health would be equally beneficial as crucial details could be elucidated. What does ODH expect of county public health offices during foodborne outbreaks? What resources does ODH make available to these offices for such events? What does ODH do to better prepare local public health offices for outbreaks? A future
study would do a great service if it asked these questions and expanded on the details of this study.

A final point of discussion, as it repeatedly comes up in this and many other papers in regards to foodborne illness investigation: communication. Despite many advances in the Internet over the last decade, its use in foodborne outbreak response is in its infancy. Even the CIFOR guidelines treat the unified program with a nebulous mention of using PulseNet or equivalent. The simple fact that there is no single national program to which public health may actively communicate outbreaks is a travesty. This is again where accreditation, from a high enough level, could make new headway breaking down the walls of autonomy local public health has built around it. The time has arrived for public to know that not all outbreaks are local and a coordinated response is the only effective mitigation strategy.

Limitations

There are a number of limitations in this study that should be acknowledged. Foremost is the use of the CIFOR guidelines as the foundation of the study. Though it is an excellent document; as noted earlier, it is not universally accepted, nor is it the most exhaustive review of the topic. The World Health Organization’s own white paper on foodborne outbreak would be closer to that mark. CIFOR did provide a reasonably concise and well dispersed document, making it superior for this study, however. The limited scope of the population sampled also diminishes this study’s strength. City public health offices were not included due to differences in funding and chain-of-command from county offices, which would have required a modified checklist to better account for these differences. The response rate further limited the strength of the findings. The greatest limiting issue, however, lies in what wasn’t incorporated in the checklist. By restraining items to only those found in the CIFOR guidelines, many items that
indirectly effect outbreak response were left out. One such item would be accreditation. A public health office accredited by a state or federal regulatory agency would have likely answered all the checklist questions in order to gain accreditation.

**Conclusion**

Recent review has shown that local public health offices have low capacity for biosurveillance. This study shows that there are key areas where improvement could be made to better facilitate an all-hazards approach to biosurveillance. Namely, these areas involve inadequate personnel, poor plan implementation, and a lack of practice and review of past responses. They should strive for a continuous improvement model that does not routinely sit upon previous laurels and miss opportunities for better response. One county was particularly vocal about this. Their Environmental Health Director explained that they had just undergone a “CIFOR Overhaul” in that last year. This consisted of a full resource review combined with CIFOR training for all appropriate personnel and will soon be complete with a system test through tabletop exercises. Needless to say, they found this study’s checklist quite easy to complete. It isn’t until all of the major counties adopt a similar approach to foodborne illness that they will have the capacity to offer a true all-hazards detection and mitigation program.
References


Appendix 1

**CIFOR County Checklist**

1. Designated Team leader
2. Epidemiologic investigator
3. Laboratory investigator
4. Public information Officer
5. Established Emergency response unit
6. Appropriate training in individual duties
7. In-field experience of individual duties
8. Individual job descriptions and expected tasks and duties
9. Prepared response protocol
10. Prepared contact list for notification (especially of external agencies)
11. Assembled reference library about foodborne illness and control measures
12. Review/update job descriptions, contact lists, and reference library at least annually
13. Provide team members with continuing education opportunities
14. Exercise teams together to foster knowledge and team building
15. Conduct debriefing following every real world event and create lessons learned
16. Have at least one admin staff person for just FBI investigation
17. Have at least one legal counsel
18. Have equipment and supplies to perform investigations
19. Have scheduled review of supplies to ensure up to date and no expired supplies
20. Laboratory test requisition forms
21. Access to Pulsenet or equivalent state-wide notification system
22. Training for Pulsenet or equivalent state-wide notification system
23. Have template for communications with public
24. Have checklist for determining if outside help is needed early
25. Have a formal process in place for initial notifications
26. Standardized outbreak questionnaires
27. Environmental assessment forms
28. Chain-of-custody forms
29. Food illness complaint worksheets
Appendix 2

County Map
### Appendix 3

**List of Public Health Competencies Met**

<table>
<thead>
<tr>
<th>Specific Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domain #1: Analytic Assessment Skill</strong></td>
</tr>
<tr>
<td>Defines a problem</td>
</tr>
<tr>
<td>Determines appropriate uses and limitations of both quantitative and qualitative data</td>
</tr>
<tr>
<td>Selects and defines variables relevant to defined public health problems</td>
</tr>
<tr>
<td>Identifies relevant and appropriate data and information sources</td>
</tr>
<tr>
<td>Evaluates the integrity and comparability of data and identifies gaps in data sources</td>
</tr>
<tr>
<td>Applies ethical principles to the collection, maintenance, use, and dissemination of data and information</td>
</tr>
<tr>
<td>Partners with communities to attach meaning to collected quantitative and qualitative data</td>
</tr>
<tr>
<td>Makes relevant inferences from quantitative and qualitative data</td>
</tr>
<tr>
<td>Obtains and interprets information regarding risks and benefits to the community</td>
</tr>
<tr>
<td>Applies data collection processes, information technology applications, and computer systems storage/retrieval strategies</td>
</tr>
<tr>
<td>Recognizes how the data illuminates ethical, political, scientific, economic, and overall public health issues</td>
</tr>
<tr>
<td><strong>Domain #2: Policy Development/Program Planning Skills</strong></td>
</tr>
<tr>
<td>Collects, summarizes, and interprets information relevant to an issue</td>
</tr>
<tr>
<td>States policy options and writes clear and concise policy statements</td>
</tr>
<tr>
<td>Articulates the health, fiscal, administrative, legal, social, and political implications of each policy option</td>
</tr>
<tr>
<td>States the feasibility and expected outcomes of each policy option</td>
</tr>
<tr>
<td>Utilizes current techniques in decision analysis and health planning</td>
</tr>
<tr>
<td>Decides on the appropriate course of action</td>
</tr>
<tr>
<td>Develops a plan to implement policy, including goals, outcome and process objectives, and implementation steps</td>
</tr>
<tr>
<td>Translates policy into organizational plans, structures, and programs</td>
</tr>
<tr>
<td>Develops mechanisms to monitor and evaluate programs for their effectiveness and quality</td>
</tr>
<tr>
<td><strong>Domain #3: Communication Skill</strong></td>
</tr>
<tr>
<td>Communicates effectively both in writing and orally, or in other ways</td>
</tr>
<tr>
<td>Solicits input from individuals and organizations</td>
</tr>
<tr>
<td>Advocates for public health programs and resources</td>
</tr>
<tr>
<td>Leads and participates in groups to address specific issues</td>
</tr>
<tr>
<td>Effectively presents accurate demographic, statistical, programmatic, and scientific information for professional and lay audiences</td>
</tr>
<tr>
<td><strong>Attitudes</strong></td>
</tr>
<tr>
<td>Listens to others in an unbiased manner, respects points of view of others, and promotes the expression of diverse opinions and perspectives</td>
</tr>
</tbody>
</table>
### Specific Competencies

#### Domain #4: Cultural Competency Skills
- Utilizes appropriate methods for interacting sensitively, effectively, and professionally with persons from diverse cultural, socioeconomic, educational, racial, ethnic and professional backgrounds, and persons of all ages and lifestyle preferences.
- Identifies the role of cultural, social, and behavioral factors in determining the delivery of public health services.
- Develops and adapts approaches to problems that take into account cultural differences.

#### Attitudes
- Understands the dynamic forces contributing to cultural diversity.
- Understands the importance of a diverse public health workforce.

#### Domain #5: Community Dimensions of Practice Skills
- Establishes and maintains linkages with key stakeholders.
- Utilizes leadership, team building, negotiation, and conflict resolution skills to build community partnerships.
- Collaborates with community partners to promote the health of the population.
- Identifies how public and private organizations operate within a community.
- Identifies community assets and available resources.
- Develops, implements, and evaluates a community public health assessment.
- Describes the role of government in the delivery of community health services.

#### Domain #6: Basic Public Health Sciences Skills
- Identifies the individual’s and organization’s responsibilities within the context of the Essential Public Health Services and core functions.
- Defines, assesses, and understands the health status of populations, determinants of health and illness, factors contributing to health promotion and disease prevention, and factors influencing the use of health services.
- Understands the historical development, structure, and interaction of public health and health care systems.
- Identifies and applies basic research methods used in public health.
- Applies the basic public health sciences including behavioral and social sciences, biostatistics, epidemiology, environmental public health, and prevention of chronic and infectious diseases and injuries.
- Identifies and retrieves current relevant scientific evidence.
- Identifies the limitations of research and the importance of observations and interrelationships.

#### Attitudes
- Develops a lifelong commitment to rigorous critical thinking.

#### Domain #7: Financial Planning and Management Skills
- Applies budget processes.
- Develops strategies for determining budget priorities.
- Monitors program performance.
- Applies basic human relations skills to the management of organizations, motivation of personnel, and resolution of conflicts.
- Conducts cost-effectiveness, cost-benefit, and cost utility analyses.
### Specific Competencies

**Domain #8: Leadership and Systems Thinking Skills**

- Creates a culture of ethical standards within organizations and communities
- Helps create key values and shared vision and uses these principles to guide action
- Identifies internal and external issues that may impact delivery of essential public health services (i.e. strategic planning)
- Facilitates collaboration with internal and external groups to ensure participation of key stakeholders
- Promotes team and organizational learning
- Contributes to development, implementation, and monitoring of organizational performance standards
- Uses the legal and political system to effect change
- Applies the theory of organizational structures to professional practice